DOCUMENT-IDENTIFIER: US 20030062305 A1

TITLE: Biological processes

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210/603

[0019] Biological process steps can be further selected from steps having a wide range of oxidation reduction potentials, for example, from those aerated with pure oxygen and having ORP=+200 mV to an iron reducing to elemental iron
processes having ORP=-500 mV. These processes can be aided by providing oxidation reduction species incorporating iron, cobalt, nickel, manganese, chromium, and less common species as vanadium, arsenic, and others.

US-PAT-NO: 5582734

DOCUMENT-IDENTIFIER: US 5582734 A

TITLE: Oxidation ditch modification and automated control system for nitrogen removal and sludge settling improvements

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d) Oxidation-Reduction Potential Control Methods. Oxygen-Reduction Potential (ORP) is a measurement of the ratio of oxidants to reductants in a system. For biological systems, ORP values are lower and become negative as oxygen is removed and nitrate is consumed. Peddie et al. (1990) showed that the change in ORP versus time could be used to determine when oxygen and nitrate were depleted after stopping aeration during operation of an aerobic sludge digester. During depletion of oxygen or nitrate, distinct changes in the slope of ORP versus time are observed. Wareham et al. (1993) showed that nitrogen removal could be improved during operation of a bench-scale aerobic digester with ORP control versus the use of a timer to turn the digester aeration on and off.

210/614

210/629

210/630

210/903

US-PAT-NO: 5240600

DOCUMENT-IDENTIFIER: US 5240600 A

TITLE: Water and wastewater treatment system

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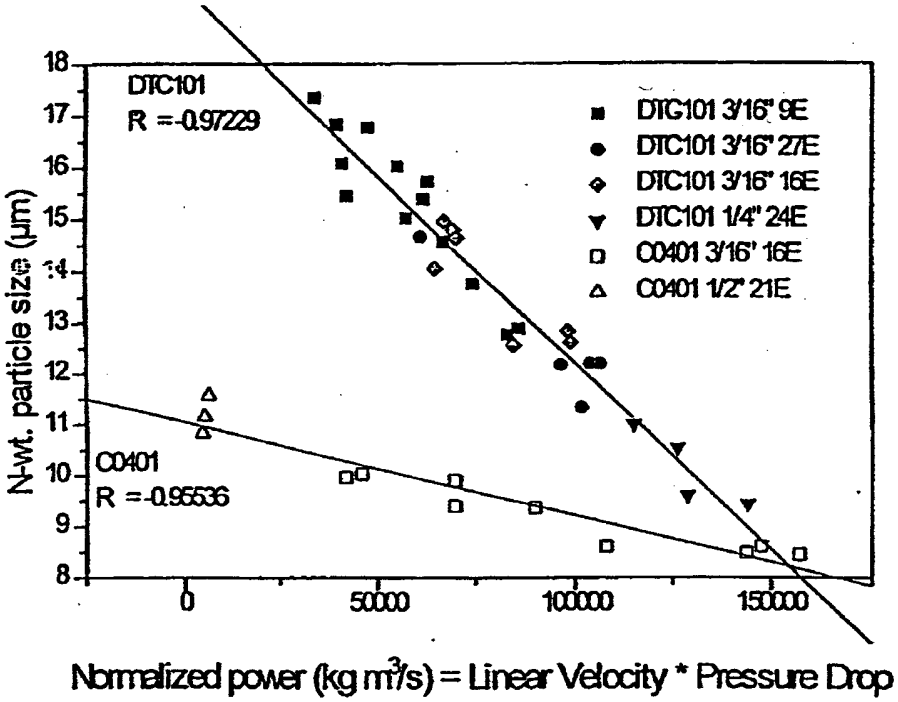
The present invention relates to a method and an apparatus for dissolving gases into liquid phases under high pressure, (ranging from 2 to 7 atmospheric pressure), and high rotation velocity (2,500 rpm or higher) in an enclosed pressure vessel, and for subsequently releasing the pressurized liquid into an open vessel in order to generate extremely fine micro bubbles with a diameter less than 80 microns to facilitate dissolved gas flotation clarification, physical-chemical treatment and biological treatment. Conventional bubble separation, recarbonation, aeration, bio-oxidation, and ozonation technologies have a low efficiency for water and wastewater treatment and require a long retention time, and large reactors.

Fig. 14


DTC101
R = -0.97229
C0401
R = -0.95536
DTG101 3/16" 9E
DTC101 3/16" 27E
DTC101 3/16" 16E
DTC101 1/4" 24E
C0401 3/16" 16E
C0401 1/2" 21E
N-wt. particle size (µm)
18
17
16
15
14
13
12
11
10
9
8
0
50000
100000
150000
Normalized power (kg m³/s) = Linear Velocity * Pressure Drop